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INTERNATIONAL STANDARD

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colour inside

Terrestrial digital multimedia broadcasting (T-DMB) receivers – Part 2: Interactive data services using BIFS

Récepteurs pour diffusion multimédia numérique terrestre (T-DMB) – Partie 2: Services de données interactifs utilisant le BIFS

IEC 62516-2:2011

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FOREWORD

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The text of this standard is based on the following documents:

CDV	Report on voting
100/1745/CDV	100/1809/RVC

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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TERRESTRIAL DIGITAL MULTIMEDIA BROADCASTING (T-DMB) RECEIVERS –

Part 2: Interactive data services using BIFS

1 Scope

This part of IEC 62516 specifies the characteristics and requirements for interactive data services using binary format for scene (BIFS) in the terrestrial digital multimedia broadcasting (T-DMB) receiver.

2 Normative references

The following referenced documents are indispensable to application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62516-1:2009, *Terrestrial digital multimedia broadcasting (T-DMB) receivers – Part 1: Basic requirement*

ISO/IEC 14496-1:2004, *Information technology – Coding of audio-visual objects – Part 1: Systems*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62516-1 and the following apply.

3.1.1
service requirements
basic conditions that the T-DMB service should satisfy

3.1.2
video service
service composed of basic video provided by the T-DMB, and audio associated with the video and optional auxiliary data

3.1.3
audio service
service composed of speech and audio possibly with auxiliary data produced by the audio compression algorithm and the multiplexing method

3.1.4
data service
service that delivers any information in digital format, which is independent from video and audio services that the T-DMB provides as basic services

3.1.5
random access
capability of receiving a service from an arbitrary point in its timeline rather than confined to progressive reception from its beginning

3.1.6
video object
data encoded by the video compression algorithm used for video services

3.1.7
audio object
Data encoded by the audio compression algorithm used for video services

3.1.8
auxiliary data
data encoded by the auxiliary data compression algorithm used for video services

NOTE Examples are scene description data and graphic data.

3.1.9
interactive service
service in which users can select or control the broadcast contents

3.2 Abbreviations

BIFS	Binary Format for Scene
BSAC	Bit scliced arithmetic coding
CD	Compact Disk
CDMA	Code Division Multiple Access
DAB	Digital Audio Broadcasting
ES	Elementary Stream
ESD	Event Summary Data
IOD	Initial Object Descriptor
LCD	Liquid Crystal Display
MMS	Multimedia Messaging Service
OD	Object Descriptor
PAT	Program Map Table
PES	Packetized Elementary Stream
PID	Packet identifier / Program identifier
PMT	Program Map Table
PNG	Portable Network Graphics
SMS	Short Message Service
LS	Sync Layer
T DBM	Terrestrial digital Multimedia Broadcasting
TS	Transport Stream
UCC	User Created Contents
VCD	Video Compact Disk
VRML	Virtual Reality Markup Language
WiBro	Wireless Broadband

4 Requirements for video services

4.1 Video objects

4.1.1 Video format

The maximum pixel resolution that video service shall support is 352 × 288 at 30 fps.

4.1.2 Video quality

Video service shall provide VCD-quality video on 7-inch LCD displays.

4.1.3 Video random access

The interval between any two adjacent video random access points shall not exceed 2 s.

4.2 Audio objects

4.2.1 Audio format

The audio associated with the video (hereafter called “associated audio”) shall support a stereo audio signal with the maximum sampling rate of 48 kHz.

4.2.2 Audio quality

The associated audio shall support up to CD-quality audio. The quality of the associated audio shall be better than that of analog FM audio.

4.2.3 Audio random access

The interval between any two adjacent audio random access points shall be within 50 ms.

4.3 Auxiliary data

4.3.1 Service format

Supplemental information and interactive services shall be provided.

4.3.2 Random access

The interval between any two adjacent random access points for auxiliary data services shall be within 0,5 s.

4.4 Service delay

4.4.1 Maximum service delay

The power-up delay shall be no greater than 2 s.

NOTE The delay does not include the start-up time of the operating system in the receiver.

4.4.2 Delay between audio-visual objects

To secure synchronization of audio, video and auxiliary data the delay between audio-visual objects shall be kept as small as possible.

- The delay of audio objects related to corresponding video objects shall not exceed −20 ms to +40 ms.
- The delay of auxiliary data related to corresponding video objects shall not exceed −300 ms to +300 ms.

4.4.3 Channel change delay

The channel change delay shall be no greater than 1,5 s.

NOTE When channels are changed with the same ensemble, the channel change delay shall not exceed 1 s.

5 Specification of auxiliary data

5.1 General

Auxiliary data specification shall be selectively used only when auxiliary information is transported or interactive services are provided.

5.2 Scene description specification

Scene description specification complies with Core2D@Level 1 defined in ISO/IEC 14496-1.

5.3 Graphic data specification

Graphic data specification complies with Core2D@Level 1 defined in ISO/IEC 14496-1.

The character codes used for “Text” nodes shall be basic characters used in the T-DMB.

6 BIFS for interactive broadcasting in T-DMB

6.1 Structure of the system and its contents

6.1.1 System structure

T-DMB system shall transmit MPEG-4 contents multiplexed by the MPEG-2 TS through the DAB stream mode channel.

6.1.2 Contents structure

The MPEG-4 contents shall comprise two kinds of service

- audio/video broadcasting: basic OD, basic BIFS, audio, and video,
- interactive broadcasting using BIFS: basic OD, basic BIFS, audio, video + interactive OD, interactive BIFS, JPEG/JPEG-2000, PNGs.

NOTE 1 Basic OD and basic BIFS designate respectively the OD and the BIFS for audio/video broadcasting only.

NOTE 2 “/” means “and/or”.

6.2 Service examples

6.2.1 Interactive broadcasting service

The interactive broadcasting using BIFS (hereafter called “interactive BIFS broadcasting”) is defined in Figure 1.

Figure 1 – Interactive BIFS broadcasting

In the interactive BIFS broadcasting, various types of services shall be possible.

6.2.2 One-way interactive service

One-way interactive service shall provide the reception of interactive data through broadcast networks while users are watching T-DMB audio/video broadcasting as follows.

- Introduction of outline, characters and background of the drama.
- Introduction of singers, lyrics and disc information in the music broadcasting.
- Introduction of athletes, their records and schedules in sports games.

6.2.3 Bidirectional interactive service

Bidirectional interactive service shall provide to users high quality services that enable the reception of interactive data by the connection to bidirectional channels, such as CDMA, WiBro, etc., while watching T-DMB audio/video broadcasting as follows.

- Webpage connection service: the service provides abundant web data by the connection to web pages contained in the interactive contents received while watching the broadcast.
- Coupling with communications service: the service coupling with SMS, MMS and contents downloading services provided by wireless operators contained in the interactive contents received while watching the broadcast.
- E-commerce service: the commercial service enables the purchase of articles or contents through the interactive contents received while watching the broadcast.

6.2.4 Broadcast-participation service

Broadcast-participation service shall enable the reception of the interactive data while watching the T-DMB audio/video broadcast, and the retransmission of user's response to the broadcast networks.

- Quiz show, voting, public-opinion poll: users shall participate in a quiz show or vote through the interactive contents received while watching the broadcast, and the result shall be retransmitted as the interactive contents to the broadcast networks.
- UCC: users shall create and transmit directly their contents through the interactive contents received while watching the broadcast to the broadcasting station, and these contents shall be filtered and retransmitted back to the broadcast networks.

7 Structure of the PMT in the interactive BIFS stream

7.1 General

The structure of the PMT used in the interactive BIFS broadcasting is different from that used in the basic audio/video broadcasting, which causes the malfunction of terminals.

Figure 2 shows the structure of the PMT used in the interactive BIFS broadcasting in comparison to that used in the basic audio/video broadcasting (the order of each ESD may be set up arbitrarily).

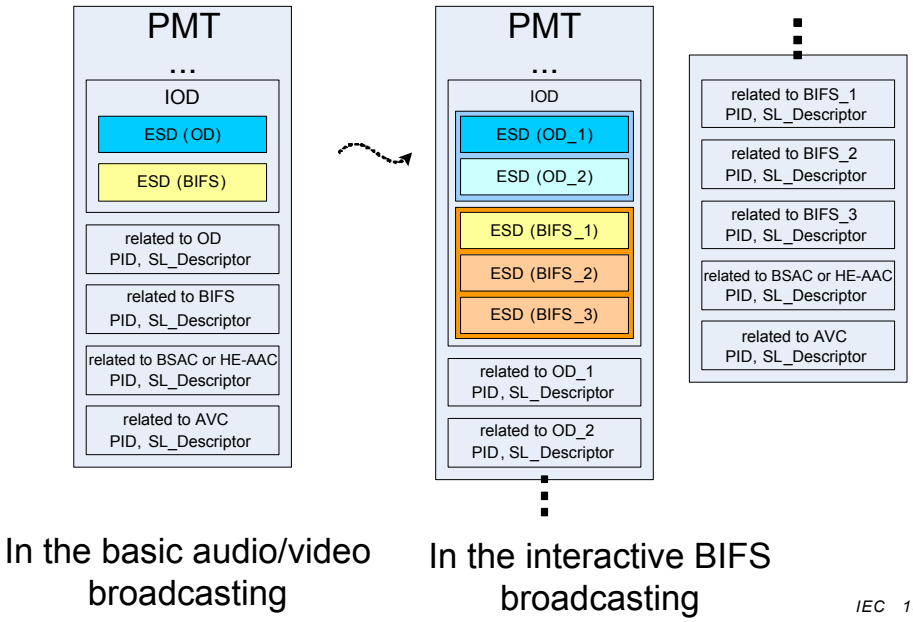

Figure 2 – Changes of the PMT structure in the interactive BIFS broadcasting

7.2 Structure of the PMT in the basic audio/video broadcasting

The IOD including an ES_Descriptor for each of the OD and the BIFS shall be transmitted, because the OD and the BIFS are transmitted by one ES respectively.

The ESs constituting a broadcasting program are OD, BIFS, audio and video. Four PIDs and the SL_Descriptor related to OD, BIFS, audio and video shall be transmitted.

7.3 Structure of the PMT in the interactive BIFS stream

The IOD including ES_Descriptors for more than two of the OD and the BIFS shall be transmitted, because the OD and the BIFS for interactive BIFS broadcasting are transmitted by multiple ESs.

Multiple PIDs and the SL_Descriptors related to several OD, BIFS, audio, video and several JPEG/JPEG-2000/PNG still images that are the ESs comprising the broadcasting program shall be transmitted.

8 Cases for terminal malfunction and solutions

8.1 Case 1: No interpretation on the IOD

8.1.1 Problem

The IOD is not interpreted on the assumption that only the audio/video content has been transmitted.

When multiple OD streams exist in the IOD, it may not be possible to distinguish OD streams related to audio/video content.

In this case, the problem occurs that the value of PID related to the audio/video contents cannot be obtained.